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10/562,124	12/23/2005	Kenichi Fukuoka	28955.1070	6278

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EXAMINER	
WILSON, MICHAEL H	
ART UNIT	PAPER NUMBER
1794	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/562,124	FUKUOKA ET AL.	
	Examiner	Art Unit	
	MICHAEL WILSON	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 November 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,7-24 and 26-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,7-24 and 26-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office action is in response to Applicant's amendment filed 26 November, 2008, which cancels claims 2-6 and 25, amends claims 1, 7-24, and 26-28, and adds new claims 29-31.

Claims 1, 7-24, and 26-31 are pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 7, 8, 14, 18-23, 30 and 31 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 7, while the specification contains support for a donor that is an alkali metal or an alkaline earth metal, there is no support for the broad recitation of a donor. Additionally it is noted that the general recitation of a donor would encompass both Lewis bases and Bronsted-Lowery acids.

Regarding claim 14, while the specification supports the sealing film having an area which is larger than the emitting-layer overlapping the anode and cathode, it does not support the broad recitation of the sealing layer being larger.

Regarding claim 18, while the specification contains support a dipolar injection layers between the cathode and the nearest light-emitting layer to the cathode and between the anode and the nearest light-emitting layer to the anode for the specific device of example 6, it does not support the general recitation of a dipolar injection layers between the cathode and the nearest light-emitting layer to the cathode and between the anode and the nearest light-emitting layer to the anode for other light-emitting devices.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 9 is rejected under 35 U.S.C. 102(b) as being anticipated by Tanaka et al. (US 6,107,734).

Regarding claim 9, Tanaka et al. disclose an organic electroluminescent device comprising at least two or more emitting layers between an anode and a cathode (column 2, lines 53-54); and an intermediate electrode layer being interposed between emitting layers (column 2, lines 56-60). The intermediate electrode layer being a single

layer or a multilayer structure of a plurality of layers (column 7, lines 42-67). The reference also discloses wherein at least one of the layers contains a semiconductive material (column 8, lines 1-8). The reference discloses wherein the semiconductive material is Li:Alq [tris(8-hydroxyquinoline)aluminum(III)], a conductive organic radical salt represented by the following instant formula (1): D_yA_z (column 9, lines 60-67). Li is a donor atom and Alq is the acceptor compound. The reference further discloses the layer may by a mix of an alkali metal (donor) and a carbon compound (donor) (column 7, lines 53-54).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1, 7, 24, 26, 28 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (US 6,107,734) in view of Mori (US 6,215,245 B1) and Tsutsui et al. (US 2003/0127967 A1).

Regarding claims 1, 7, 24, and 31, Tanaka et al. disclose an organic electroluminescent device comprising:

- at least two or more emitting layers between an anode and a cathode (column 2, lines 53-54);
- and an intermediate electrode layer being interposed between emitting layers (column 2, lines 56-60);
    - the intermediate electrode layer being a single layer or a multilayer structure of a plurality of layers (column 7, lines 42-67);
    - at least one of the layers comprising a semiconductive material having a resistivity of 0.001 to 10,000 Ω·cm.

Additionally the reference discloses that the semiconducting material may be a an acceptor that is a conductive oxide containing a transition metal, CuO, (column 8, lines 12 and 29), and a donor that is an alkali metal and/or an alkaline earth metal column 8, lines 6-8 and 19-20). The reference also discloses that electrode material and compounds with electron injection ability may be used in the intermediate layer (column 7, lines 48, 49-50; column 8, lines 7-8). However the reference does not explicitly disclose IrO2, Mo2, NbO, Os2, ReO2, or ReO3 as suitable material.

Mori teaches a similar electroluminescent device with a cathode that has improved interfacial cohesion and electron injection efficiency (column 1, line 67 to

column 2, line 2). The reference teaches IrO2, Mo2, NbO, Os2, ReO2, or ReO3 are suitable compounds for use in the cathode (column 3, lines 50-52).

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the transition metal oxides of Mori with the device of Tanaka et al. One of ordinary skill would reasonably expect success because Mori teaches the compounds as suitable for cathodes and teaches the compounds to stabilize alkali metals in a cathode (column 3, lines 29-32).One of ordinary skill in the art would be motivated by a desire to improve interfacial cohesion and electron injection efficiency (column 1, line 67 to column 2, line 2).

Tsutsui et al. teach a similar organic electroluminescent device [0001] with an intermediate electrode (figures 2B and 7). The reference teaches n-type and p-type materials mixed into the same layer ([0110] and [0117]) making a single donor-acceptor layer as an intermediate layer (electrode). The reference also teaches using alkali metals in the same layer [0117].

It would be obvious to one of ordinary skill in the art at the time of the invention to add the teaching of Tsutsui et al. to the device of modified Tanaka et al. making the layer containing the n-type and p-type semiconductors and the electron injection ability compound in to a single layer. One of ordinary skill would reasonably expect such a combination would be suitable given that Tsutsui et al. teach the materials may be used in the same layer. One of ordinary skill would be motivated by a desire to simplify the layer design of the device.

Regarding the resistivity limitations of claims 1 and 24, while Tanaka et al. does not explicitly disclose the resistivity of the semiconducting materials, the materials are the same as those disclosed by applicant as having the claimed resistivity. Therefore, the resistivity of semiconducting materials would be expected inherently to have the same properties as disclosed by applicant. Recitation of a newly disclosed property does not distinguish over a reference disclosure of the article or composition claims. *General Electric v. Jewe Incandescent Lamp Co*., 67 USPQ 155. *Titanium Metal Corp. v. Banner*, 227 USPQ 773. Applicant bears responsibility for proving that reference composition does not possess the characteristics recited in the claims. In *re Fritzgerald*, 205 USPQ 597, In *re Best*, 195 USPQ 430.

Regarding claim 26, Tanaka et al. disclose all the claim limitations as set forth above. Additionally the reference discloses wherein the intermediate electrode layer is a bipolar charge injection layer (column 7, line 41 to column 8, line 8). Additionally the intermediate conductive layer must perform the function of supplying holes to one emissive layer and electrons to the emissive layer on the opposite side of the intermediate conductive layer, which is the function of a bipolar charge injection layer, in order for the device of Tanaka et al. to work.

Regarding claim 28, modified Tanaka et al. discloses all the claim limitations as set forth above. Additionally the reference discloses wherein the device is comprised in a display device, such as an SVGA screen of over 12 inches (column 3, lines 42-48).

9. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (US 6,107,734) as applied to claim 9 above and in view of Liao et al. (US 2003/0170491 A1).

Regarding claims 10 and 11, modified Tanaka et al. discloses all the claim limitations as set forth above. Additionally the reference discloses wherein the semiconductive material is Li:Alq [tris(8-hydroxyquinoline)aluminum(III)], a conductive organic radical salt represented by the following instant formula (1): D_yA_z (column 9, lines 60-67). Li is a donor atom and Alq is the acceptor compound. The reference further discloses the layer may by a mix of an alkali metal (donor) and a carbon compound (donor) (column 7, lines 52-53). However the reference does not explicitly disclose other conductive organic radical salts.

Liao et al. teach a similar organic electroluminescent device with multiple emissive layers (abstract). The reference teaches that bis-(ethylenedithio)-tetrafulvalene (BEDT-TTF) and tetrafulvalene (TTF) are n-type dopants with strong electron-donating properties [0063]. The reference also teaches that 2,3,5,6-tetrafluoro-7,7,8,8-tetracyanoquinodimethane (F4-TCNQ) and other derivatives of TCNQ are p-type dopants with strong electron-withdrawing properties [0063].

It would be obvious to one of ordinary skill in the art at the time of the invention to use the p and n type materials of Liao et al. in the device of Tanaka et al. One of ordinary skill in the art would recognize that the p and n type materials of Liao et al. would be suitable for the device of Tanaka et al. given that both references teach similar organic electroluminescent devices and teach p and n type materials used in similar

layers, positioned between emissive layers, and perform the same function. One of ordinary skill in the art would be motivated by a desire to increase brightness [0028], lifetime [0029], and lower driving voltage [0030] as taught by Liao et al.

Regarding claim 12, modified Tanaka et al. discloses all the claim limitations as set forth above. Additionally the reference discloses alkali and alkaline earth metals as preferable electron injection compounds (column 8, lines 19-21), which would act as donor compounds. The reference also discloses Li as the donor compound in an intermediate conductive layer (column 9, lines 60-67).

10. Claims 13, 17, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parthasarathy et al. (US 6,420,031 B1) in view of Mori (US 6,215,245 B1).

Regarding claim 13, Parthasarathy et al. discloses an organic electroluminescent device comprising one or more emitting layers between an anode and a cathode (column 4 lines 14-18; column 10, lines 47-54; and figure 2a). The cathode comprises at least one metal oxide (column 9, lines 42-47) and the cathode has a light transmittance of 80% or more (column 4, lines 1-2). However the reference does not explicitly disclose a metal oxide and donor compound in the same layer.

Mori teaches a similar electroluminescent device with a cathode that has improved interfacial cohesion and electron injection efficiency (column 1, line 67 to column 2, line 2). The reference teaches IrO2, Mo2, NbO, Os2, ReO2, or ReO3 are suitable compounds for use in the cathode (column 3, lines 50-52). The reference

teaches that using the metal oxides with an alkali metal, such as Na or K, stabilizes the metal (column 3, lines 30-35).

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the alkali metal and transition metal oxide layer of Mori with the cathode of Parthasarathy et al. One of ordinary skill would reasonably expect success because Mori teaches the compounds as suitable for material and teaches the compounds to stabilize alkali metals in a cathode (column 3, lines 29-32).One of ordinary skill in the art would be motivated by a desire to improve interfacial cohesion and electron injection efficiency (column 1, line 67 to column 2, line 2).

Regarding claim 17, Parthasarathy et al. disclose all the claim limitations as set forth above. Additionally the reference discloses wherein the cathode has a donor layer of copper phthalocyanine or zinc phthalocyanine which is about 10% of the cathode (cathode comprises electron injection and ITO layers, column 19, lines 54-57).

Regarding claim 29, modified Parthasarathy et al. discloses all the claim limitations as set forth above. Additionally the reference discloses the cathodes of modified Parthasarathy et al. are useful in OLED's (column 19, lines 20-30), which are useful as replacements for the LCD screen in full-color flat panel displays (column 1, line 35-45).

11. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parthasarathy et al. (US 6,420,031 B1) in view of Tsutsui et al. (US 2003/0127967 A1) as applied to claim 13 above and further in view of Okada et al. (US 6,143,434).

Regarding claims 14-16, modified Parthasarathy et al. disclose all the claim limitations as set forth above. However the reference does not explicitly disclose a sealing film.

Okada et al. teach an electroluminescent device with a protective layer (sealing film) (column 26, line 39). The protective layer protects the device from any substance which will accelerate deterioration such as water or oxygen (column 29, lines 38-41). The reference teaches metal oxides such as MgO, SiO, SiO2, GeO, NiO, and TiO2 are suitable for the protective layer (column 30, lines 1-2). While the reference does not explicitly teach the positioning of the layer it would be obvious to one or ordinary skill in the art at the time of the invention to place the protective layer over the cathode in order to protect the cathode and the rest of the device from deterioration and to overlap the layer in order ensure a good seal with the sealing layer. The reference also does not explicitly teach the materials as transparent. However, it would be obvious to one of ordinary skill in the art at the time of the invention to use transparent material for the protective layer in order to maximize the light emitted from the device. Additionally the metal oxides taught by Okada et al. being the same as those disclosed by applicant as being transparent, the material of Okada et al. would be expected to inherently posses the same properties, meeting the claimed limitation.

It would be obvious to one of ordinary skill in the art at the time of the invention to use the protective layer of Okada et al. in the device of Parthasarathy et al. in order to protect the device from water and oxygen [0158]. It would also be obvious to make the protective layer to cover a larger area than the emitting layer, for example encapsulating

the device, in order to protect more effectively protect the device from oxygen and moisture.

12. Claims 18-22 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (US 6,107,734).

Regarding claim 18, Tanaka et al. disclose an organic electroluminescent device comprising one or more emitting layers between an anode and a cathode (column 2, lines 56-59) and bipolar charge injection layers being interposed between the anode (column 7, lines 42-67). However the reference does not explicitly disclose bipolar charge injection layers separating the outer the light emitting layers and the electrodes.

However given that the bipolar charge injection layers serve as anode and cathode for the adjacent light-emitting layers it would be obvious to place bipolar charge injection layers between the cathode and the light-emitting layer nearest the cathode and between the anode and the light-emitting layer nearest the anode. One of ordinary skill in the art would reasonably expect such an arrangement to be suitable given that bipolar charge injection layers act as intermediate electrodes. One of ordinary skill would be motivated to try because one would expect two “cathodes” and “anodes” to more effectively inject holes and electrons into the light-emitting layers than a single cathode and anode. It is well settled that it is *prima facie* obvious to combine two ingredients, each of which is targeted by the prior art to be useful for the same purpose. *In re Lindner* 457 F,2d 506,509, 173 USPQ 356, 359 (CCPA 1972). Also, case law holds that “it is *prima facie* obvious to combine two compositions each of which is taught

by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... [T]he idea of combining them flows logically from their having been individually taught in the prior art." *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980).

Regarding claims 19-22, Tanaka et al. disclose all the claim limitations as set forth above. Additionally the reference discloses wherein the bipolar charge injection layers comprise at least one donor and at least one acceptor (column 7, line 42 to column 8, line 8). The reference also discloses wherein the acceptor is an oxide of a transition metal, such as CuO (column 8, line29) and donor is an alkali metal and/or an alkaline earth metal (column 8, lines 19-20). The bipolar charge injection layers comprise a mixture of at least one element single substance selected from the group of Cs, Li, Na and K (column 8, lines 4-5); and CuO (column 8, line 29).

Regarding claim 30, modified Tanaka et al. discloses all the claim limitations as set forth above. Additionally the reference discloses wherein the device is comprised in a display device, such as an SVGA screen of over 12 inches (column 3, lines 42-48).

13. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (US 6,107,734) as applied to claim 22 above.

Regarding claim 23, modified Tanaka et al. disclose all the claim limitations as set forth above. Additionally the reference discloses wherein the content of the element (Li) is 1.5% (column 9, lines 60-64), but does not explicitly disclose a range for the wt% of the element content.

Although the reference does not disclose a wt% of 2 to 20%, it is the examiner's position that the values are close enough that one of ordinary skill in the art would have expected the same properties. Case law holds that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. Case law holds that a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985).

In light of the case law cited above and given that there is only a "slight" difference between the amount of Li (the element) disclosed by Tanaka et al. and the amount disclosed in the present claims and further given the fact that no criticality is disclosed in the present invention with respect to the amount of Li (the element), it therefore would have been obvious to one of ordinary skill in the art that the amount of Li (the element) disclosed in the present claims is but an obvious variant of the amounts disclosed in Tanaka et al., and thereby one of ordinary skill in the art would have arrived at the claimed invention.

14. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka et al. (US 6,107,734) as applied to claim 18 above, and further in view of Forrest et al. (US 5,703,436).

Regarding claim 27, modified Tanaka et al. disclose all the claim limitations as set forth above. However the reference does not explicitly disclose that the cathode and bipolar charge injection layers are the same.

Forrest et al. teach a similar electroluminescent device where the cathode and intermediate electrodes (or bipolar charge injection layers) are the same (column 4, line 49 to column 5, line 14; and figure 2c).

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Forrest et al. with the device of Tanaka et al. One of ordinary skill would reasonably expect success given that both references disclose similar devices with multiple emitting layers separated by connecting layers. One of ordinary skill would be motivated by a desire to simplify the device for easier manufacturing.

Response to Arguments

15. Applicant's arguments filed 26 November, 2008 have been fully considered but they are not persuasive.

Applicant argues that Tanaka et al. (US 6,107,734) does not disclose applicants' claimed intermediate electrode layer. Tanaka et al., applicants assert, nowhere disclose an intermediate electrode layer comprising a semiconductive material comprising an acceptor that is a conductive oxide containing a transition metal, and a donor, in the same layer but teaches stacked layers of P-type semiconductor and N-type semiconductor. However while the reference does teach stacked P-type semiconductor and N-type semiconductor material the reference also teaches a single layer as one of

the alternatives ((c), column 7, line 52) and that items (a) to (f) may be combined (column 61-63). Also Tsutsui et al. (US 2003/0127967 A1) teaches P-type semiconductor and N-type semiconductor material mixed into a single layer for an intermediate electrode. Therefore, as described above Tanaka et al. in view of Tsutsui et al. teaches intermediate electrode layer comprising a semiconductive material comprising an acceptor that is a conductive oxide containing a transition metal, and a donor, in the same layer.

Applicants also argue concerning Tanaka et al. that Alq is an electron transport material and not an acceptor. However, while the examiner agrees that Alq is an electron transport material, one material may perform more than one function. When mixed with Li, given that Li is an extremely powerful donor, it is the examiners position that Alq acts as both acceptor and electron transport material.

Applicants also argue regarding Tanaka et al. with Mori et al. that a person of ordinary skill in the art would not be motivated to substitute the hole injection In-Zn-O film of Tanaka et al. with Mori's cathode material comprising sodium or potassium and a conductive oxide. Furthermore, applicants assert that while Mori states that conductive oxides are suitable for use in the cathode to stabilize the sodium or potassium material, Mori does not say that the conductive oxides enhance the injection efficiency of the cathode. However the examiner does not assert replacing the In-Zn-O of Tanaka et al. with Mori's cathode material, but adding the conductive oxides of Mori et al. with the electron injection ability alkali metal (Li) of Tanaka et al. for the purpose of stabilizing the metal, improving interfacial cohesion and electron injection efficiency, which are taught

by Mori et al. as benefits of the combination (column 1, line 67 to column 2, line 2 and column 3 lines30-35).

Regarding Parthasarathy et al. (US 6,420,031 B1), applicants argue the reference does not disclose least one donor and at least one acceptor comprising a metal oxide in the same layer. The examiner agrees that Parthasarathy et al. alone does not disclose least one donor and at least one acceptor comprising a metal oxide in the same layer. However Parthasarathy et al. in view of Mori et al. (US 6,215,245 B1) does disclose least one donor and at least one acceptor comprising a metal oxide in the same layer, as explained above.

Regarding arguments concerning Liao et al. (US 2003/0170491 A1) and Forrest et al. (US 5,703,436) these reference are used as teaching references and are not argued by themselves to disclose all the limitations of the above claims. Rather these references are used to supply knowledge one of ordinary skill in the art would have access to and that in combination with a primary reference renders each of each the applied claims obvious of the applied combination of references. Specifically Forrest et al. is used merely to teach the intermediate electrodes and the cathode may be the same material, and Liao et al. is used to teach specific organic n-type and p-type semi-conducting materials. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL WILSON whose telephone number is (571) 270-3882. The examiner can normally be reached on Monday-Thursday, 7:30-5:00PM EST, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on (571) 272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

18. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MHW

/Callie E. Shosho/
Supervisory Patent Examiner, Art Unit 1794